

ELECTRONIC FUNDAMENTALS

SERVICE PRACTICES 1

HOW TO IDENTIFY RECEIVER PARTS

1-1. How To Identify Parts

1-2. Radio, TV, and Phonograph Parts



RCA INSTITUTES, INC.

A SERVICE OF RADIO CORPORATION OF AMERICA

HOME STUDY SCHOOL

350 West 4th Street, New York 14, N. Y.

Service Practices 1

INTRODUCTION

This is your first Service Practices booklet. In these booklets, you will find the kind of information that only a radio and television serviceman with years of experience could provide. So, as you learn the theory of electronics, radio, and TV, you will also build up your knowledge of the practical methods of successful servicemen.

Professional people, such as doctors, dentists, and lawyers, usually spend a year or two getting practical experience *after* graduation. In fact, to qualify for most jobs that require knowledge and skill, a person must put in some time getting experience. It's like the apprentice period of a learner in a skilled trade. With this course, you can get experience as you study.

Many of the jobs done by radio and television servicemen require very little training to do well. For example, installing a radio, putting up an antenna, polishing a cabinet, testing tubes — these and many other operations are quickly learned. In fact, you will know how to do certain kinds of radio work *after* very few lessons. Then, if you wish, you may do some part-time radio work for yourself or for some local dealer and actually earn while you learn.

After you are through with each Theory Lesson and have performed the experiments in the Experiment Lessons, turn to the Service Practices booklet that you will receive with each lesson and add to your practical training. Read each Service Practices booklet carefully; then place it in a loose-leaf binder or some place where you can readily find it. By the time you have completed this course, you will find that all of these Service Practices booklets will form a handbook of

the kind of information that experienced radio and TV servicemen use every day in their work. When you have all of the Service Practices booklets, you will find in them the answers to many of the problems that will come up in your radio and TV work.

1-1. IDENTIFICATION OF PARTS

All radio receivers, phono players, and TV sets are made with *resistors*, *capacitors*, (sometimes called condensers by old-time radio servicemen), *inductors*, and *electron tubes*. An example of each of these parts is shown in Fig. 1-1.

It is important to know what radio, phonograph, and TV parts look like because:

1. Knowing parts makes circuits easier to trace when you are trouble-shooting.
2. All parts are not tested in the same manner. Therefore, you must know one part from another in order to give it the proper test.
3. In order to replace a defective part, you must know what part to order.

Even without much training or experience, many people can make a repair or remove a part and replace it with a new one, once the trouble is found. The greater part of servicing time is often spent in locating the bad part. But knowing parts is necessary in order to locate trouble.

Of course, there is no substitute for knowing *why* certain parts are used as they are, or for knowing *how* they work. That's where the theory you will learn in this course comes in. No matter how familiar you

may get with parts and no matter how expert you may become in replacing them, a real success in servicing can come only when you know the theory behind each part and know what can go wrong with it. The man who locates troubles in the least amount of time is the man who knows his theory. Because he locates troubles faster, he can easily handle more jobs and make more money. The slowpoke is the man who isn't sure of himself because he just doesn't *know*. So, never neglect to learn the theory; it is as important as anything else in this course.

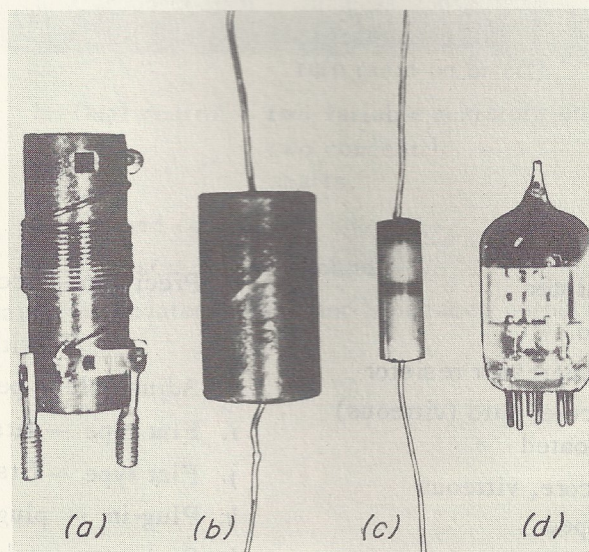
1-2. RADIO, TV, AND PHONOGRAPH PARTS

In the pages that follow, the most commonly used parts are grouped together in figures. The parts shown in each figure have some quality or characteristic in common that makes it convenient to group them all together. For example, one figure shows fixed and adjustable resistors. It includes many kinds of resistors; some are made from carbon, others are made from wire. They have different shapes, sizes, and outer coverings, but no matter what they are made from or what they look like, they are all resistors.

This figure is followed by one showing variable resistors. Variable resistors are used in radio and TV receivers as volume controls, tone controls, brightness controls, and in the adjustment of many other circuits. Another figure illustrates fixed capacitors, followed by still another one showing variable capacitors.

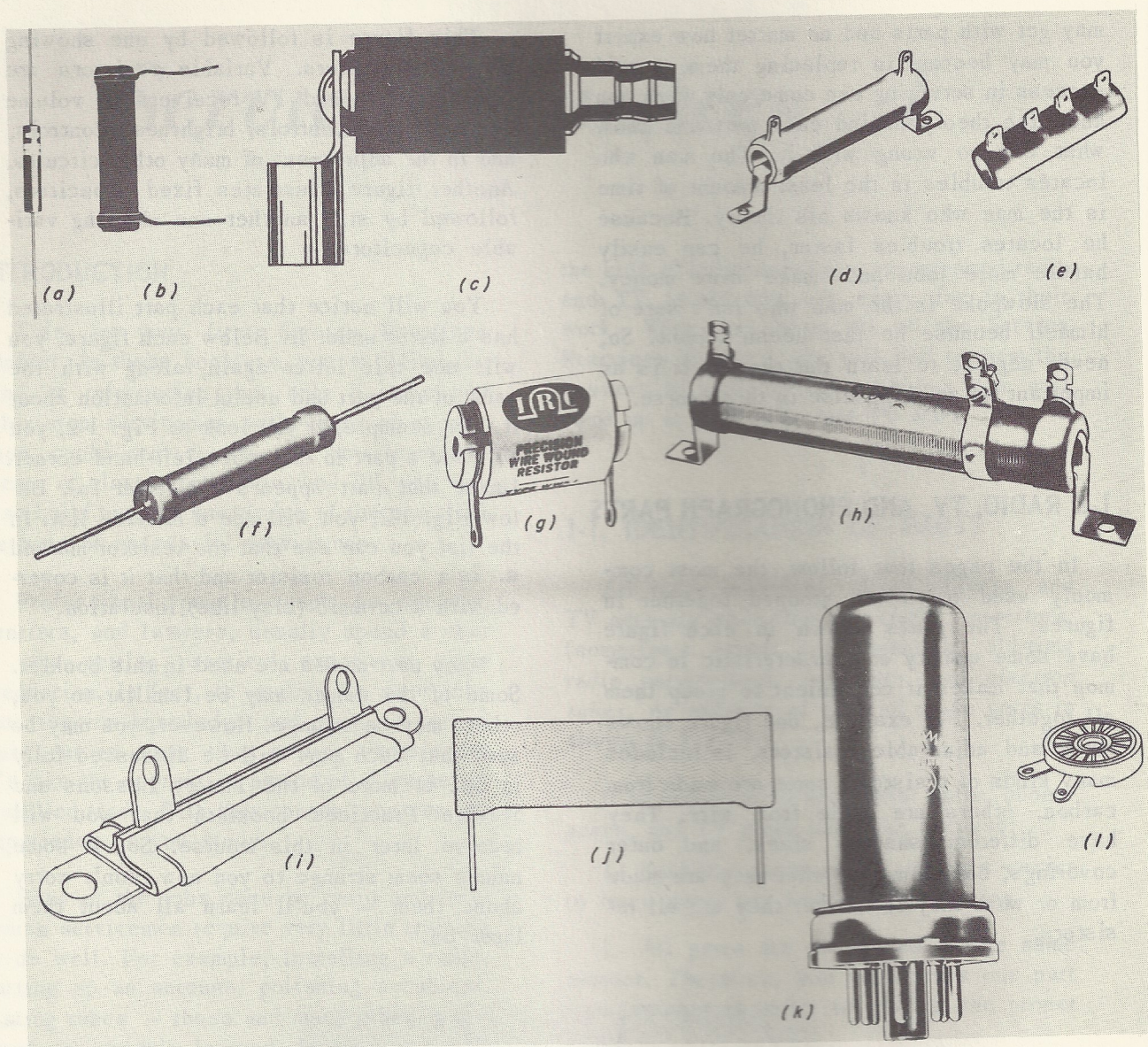
You will notice that each part illustrated has a letter under it. Below each figure, you will see this letter again, along with the name of the part and useful information about it. For example, if you look at Fig. 1-2, you will see a part in the upper left-hand corner. Under that part appears the letter (a). Below Fig. 1-2, you will see a lettered list. In the list you can see that the resistor marked a. is a carbon resistor and that it is covered with a ceramic (clay-like) insulation.

Many part names are used in this booklet. Some of the names may be familiar to you, others may be strange. However, you may be sure that each part will be discussed fully in one or more of the Theory Lessons and Service Practices booklets that you will receive later in this course. So, if some names seem strange to you now, don't worry about them — you'll learn all about them later on.



- a. Inductor
- b. Capacitor
- c. Resistor
- d. Electron tube

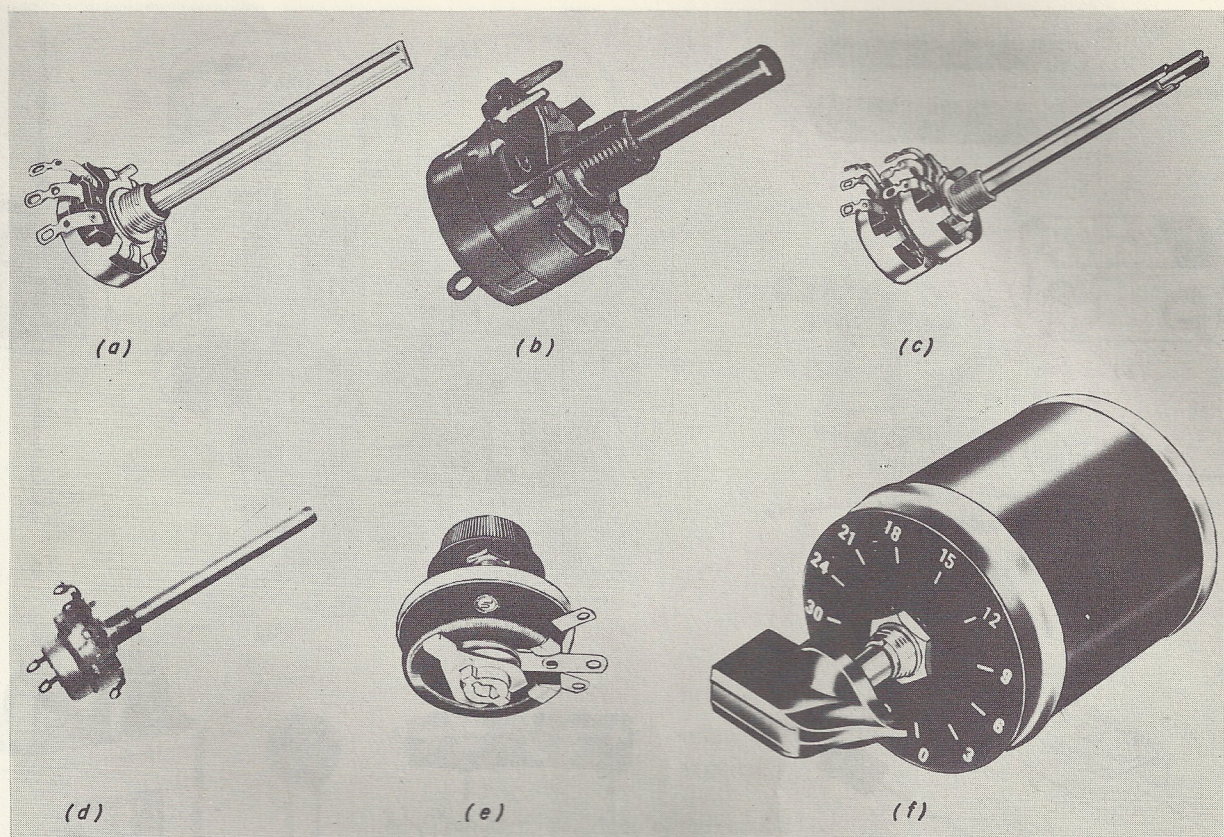
Fig. 1-1. Fundamental Components



- a. Carbon — ceramic insulated
- b. Carbon — non-insulated
- c. Carbon — auto-radio suppressor resistor
- d. Wirewound — ceramic core, hard (vitreous) enamel coated
- e. Wirewound — ceramic core, vitreous core, tapped
- f. Wirewound — ceramic cover (looks like carbon resistor)

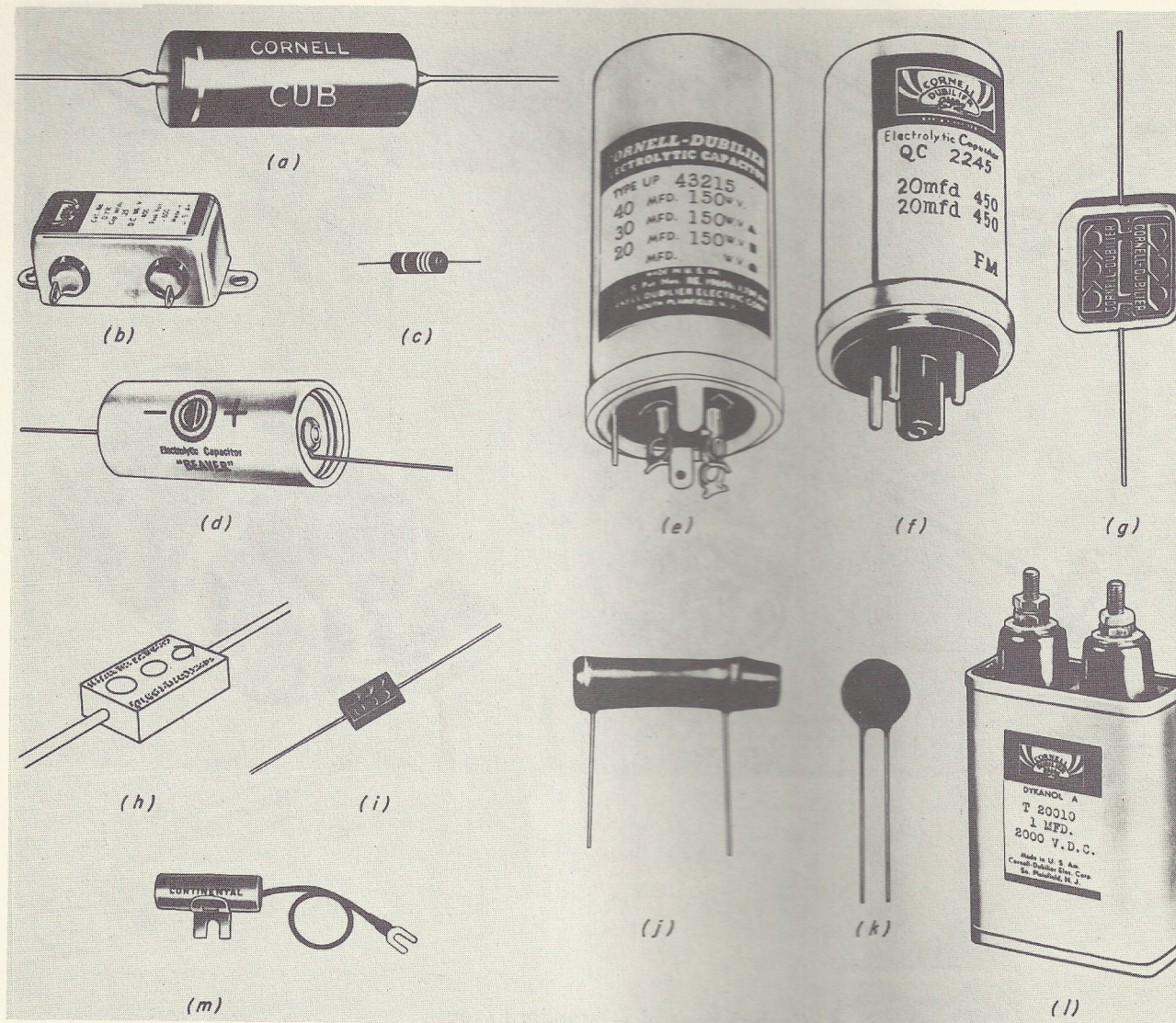
- g. Precision — accurate within 1% (most resistors are accurate only to within 10%)
- h. Adjustable — permits close accuracy
- i. Flat type — fits in tight places
- j. Flat type — fits in tight places
- k. Plug-in — plugs into socket like a tube
- l. Disk type — takes little space

Fig. 1-2. Fixed and Adjustable Resistors



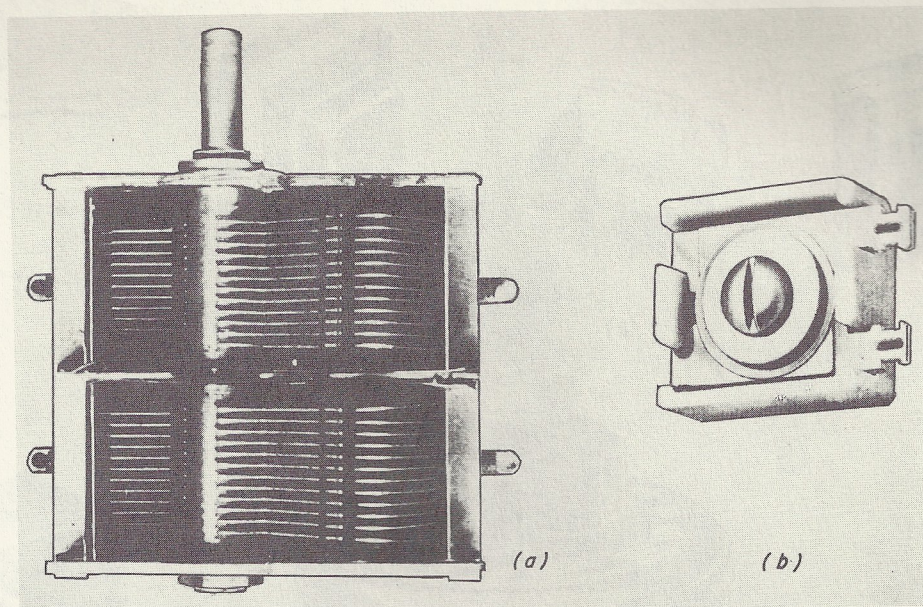
- a. Carbon control — standard type
- b. Carbon control — same as above with switch (used to turn radio on or off)
- c. Dual control — two variable resistors on two concentric shafts
- d. Tapped control
- e. Rheostat — wirewound
- f. Attenuator — constant-impedance output

Fig. 1-3. Variable Resistors



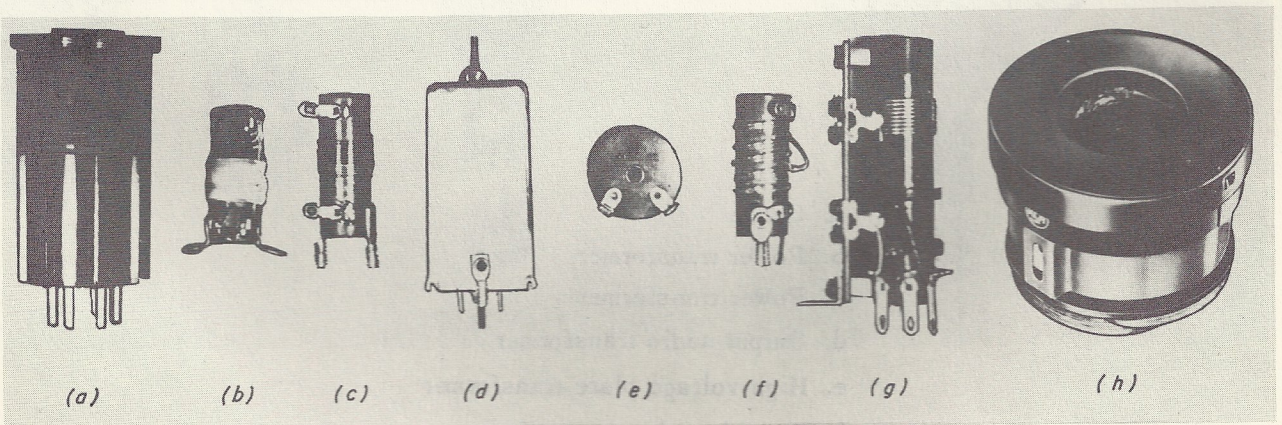
- | | |
|--|--|
| a. Tubular paper | g. Mica |
| b. Paper in metal can, called bathtub | h. Mica |
| c. Molded metallized paper, looks like carbon composition resistor | i. Silver-mica |
| d. Electrolytic – paper covered | j. Ceramic |
| e. Electrolytic – metal covered | k. Disk type – uses ceramic between plates |
| f. Electrolytic – metal covered, plugs into socket | l. High-voltage, oil-filled |
| | m. Auto-generator |

Fig. 1-4. Fixed Capacitors



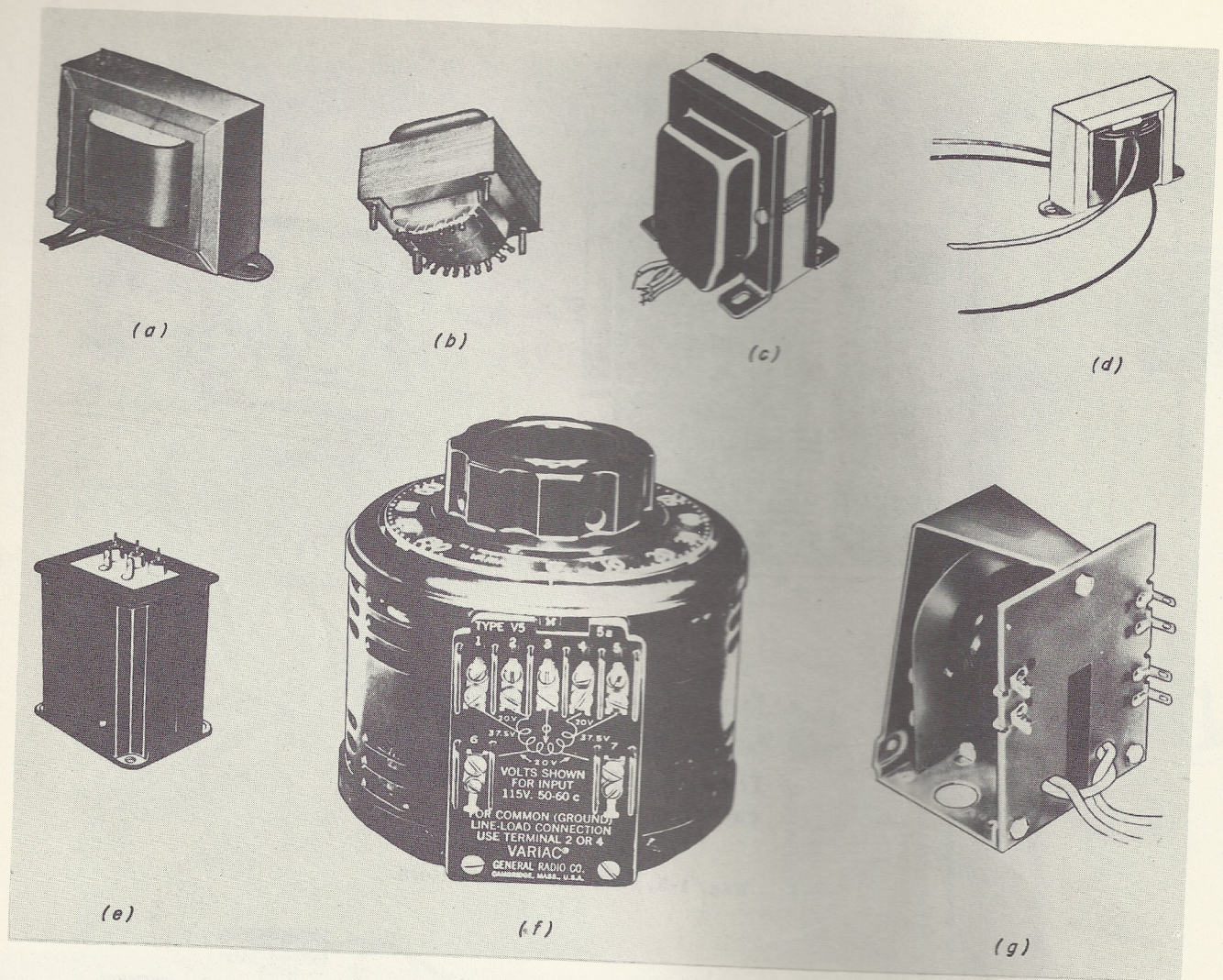
- a. Tuning capacitor — used to tune in stations
- b. Trimmer, padder, or neutralizing capacitor

Fig. 1-5. Variable Capacitors



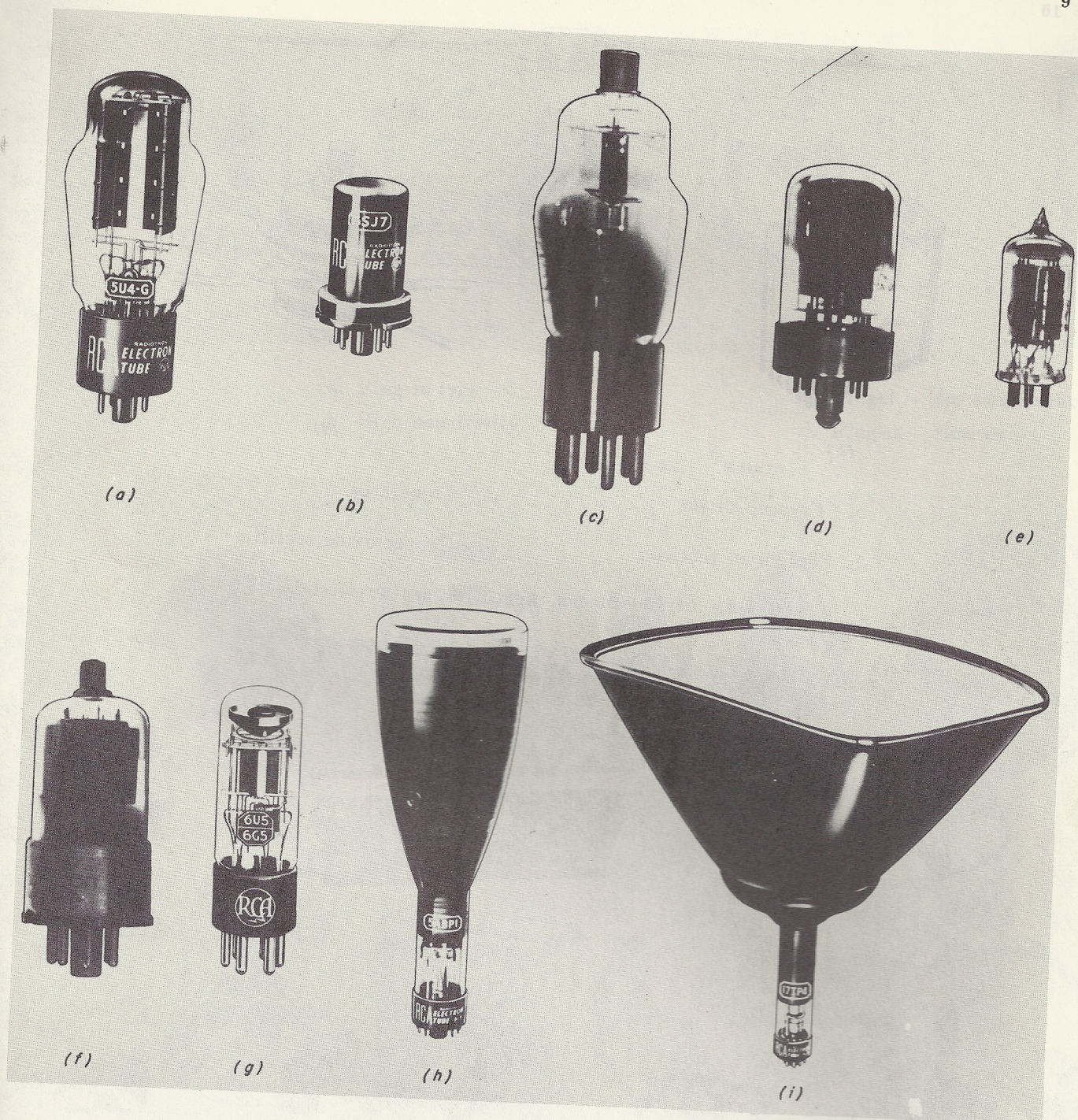
- a. Plug-in coil
- b. R-F transformer — for standard broadcast frequencies
- c. Oscillator coil
- d. I-F (intermediate-frequency) transformer
- e. R-F choke
- f. R-F transformer — for FM
- g. R-F transformer — for standard and short-wave land receiver
- h. Yoke for television picture tube

Fig. 1-6. Air-Core Coils



- a. Choke
- b. Power transformer
- c. Power transformer
- d. Output audio transformer
- e. High-voltage plate transformer
- f. Variable-voltage transformer
- g. Television flyback transformer

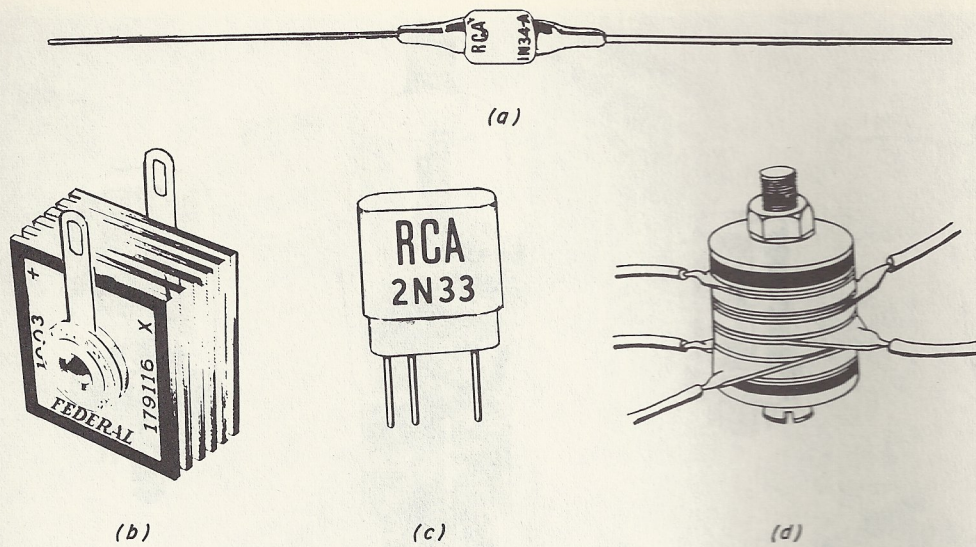
Fig. 1-7. Iron-Core Coils



- a. Glass envelope rectifier with octal base
- b. Metal shell with octal base
- c. Glass envelope pentode tube with grid cap
- d. Lock-in type
- e. 7-pin miniature

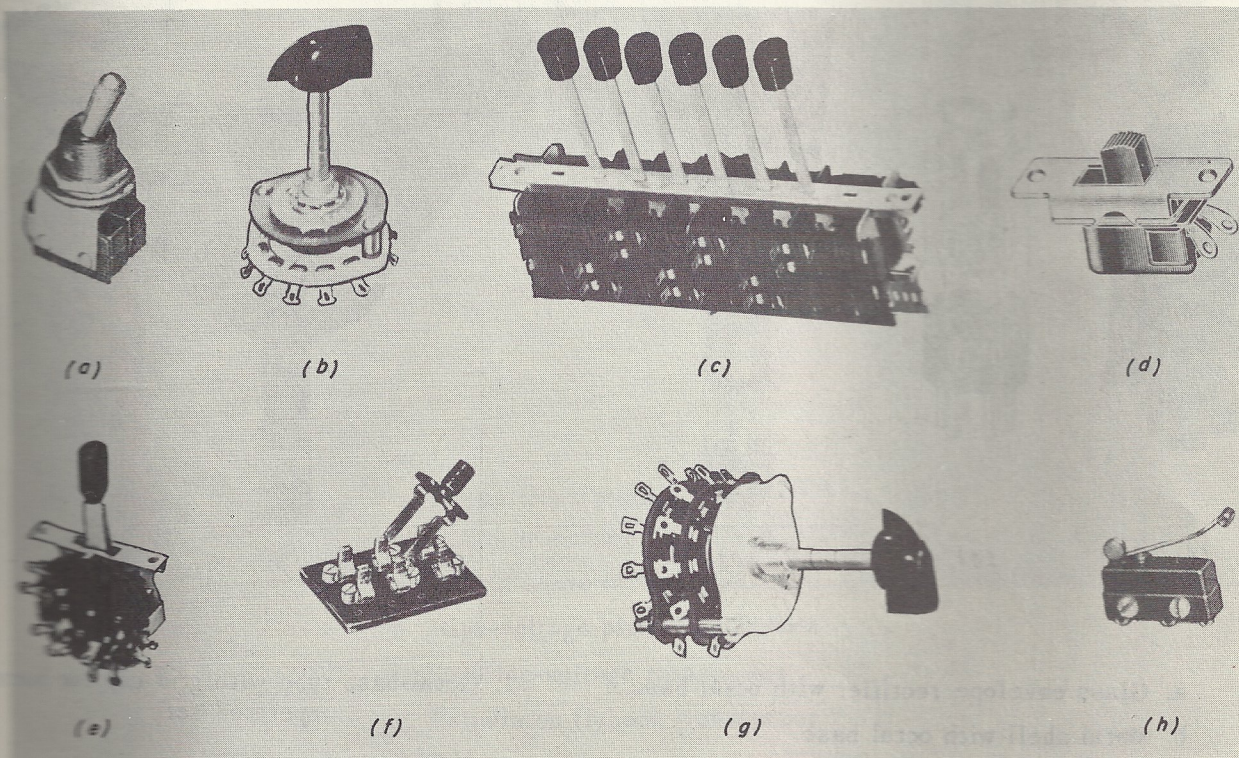
- f. Octal-base tube with grid cap for battery-operated set
- g. Magic eye
- h. Cathode-ray oscilloscope tube
- i. Television picture tube (kinescope)

Fig. 1-8. Electron Tubes



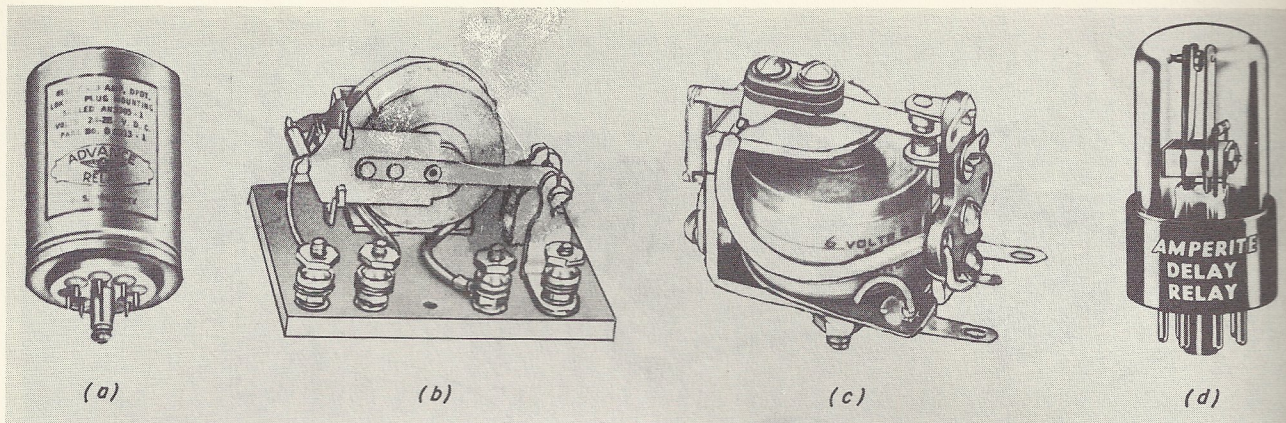
- a. Crystal diode c. Transistor
b. Selenium rectifier d. Copper oxide rectifier

Fig. 1-9. Crystal Diodes, Rectifiers, and Transistors



- a. Toggle e. Lever action
b. Rotary f. Knife throw
c. Pushbutton g. Multisection band
d. Slide type h. Snap action

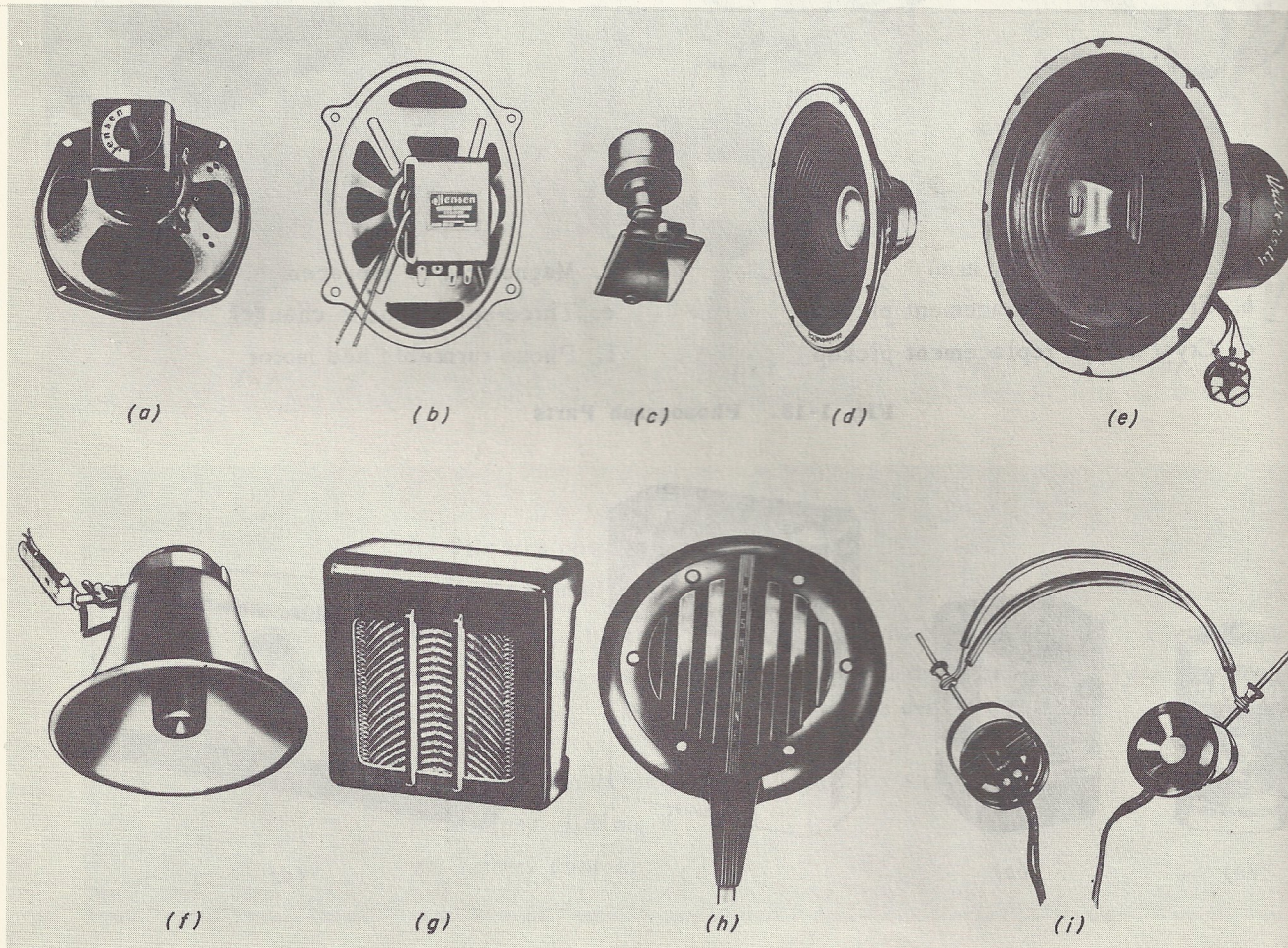
Fig. 1-10. Switches



- a. Plug-in type
- b. High sensitivity

- c. Midget — (for small spaces)
- d. Plug-in — time delay

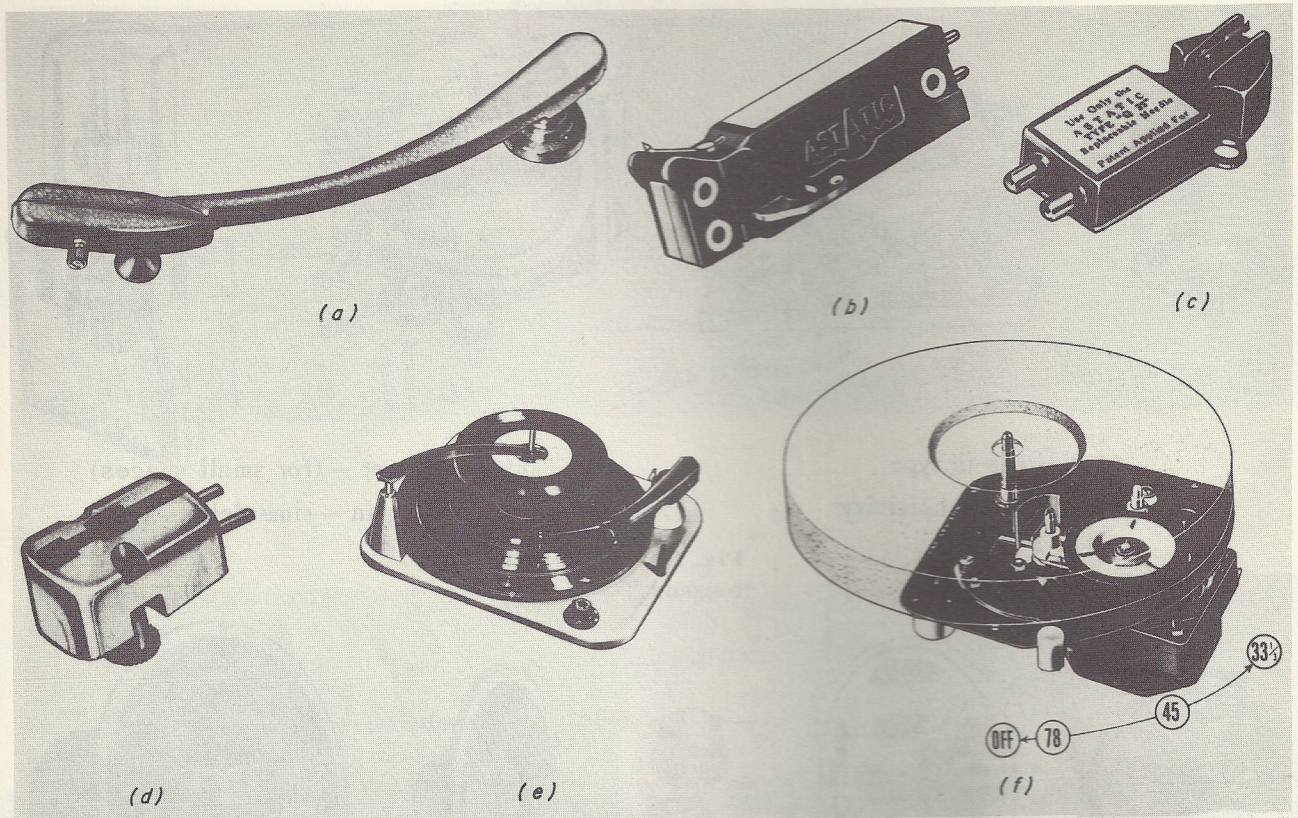
Fig. 1-11. Relays



- a. Permanent-magnet speaker
- b. Electrodynamic speaker
- c. Tweeter (reproduces high notes)
- d. Woofer (reproduces low notes)
- e. Hi-Fi coaxial speaker

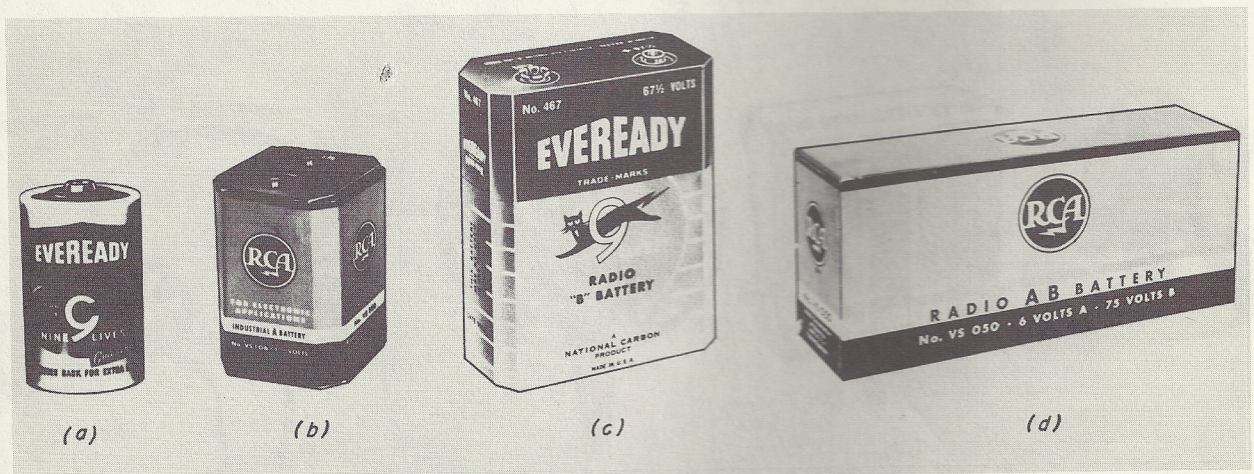
- f. Reflex-type speaker
- g. Speaker baffle and cabinet
- h. Pillow speaker
- i. Pair of earphones

Fig. 1-12. Loudspeaker Equipment



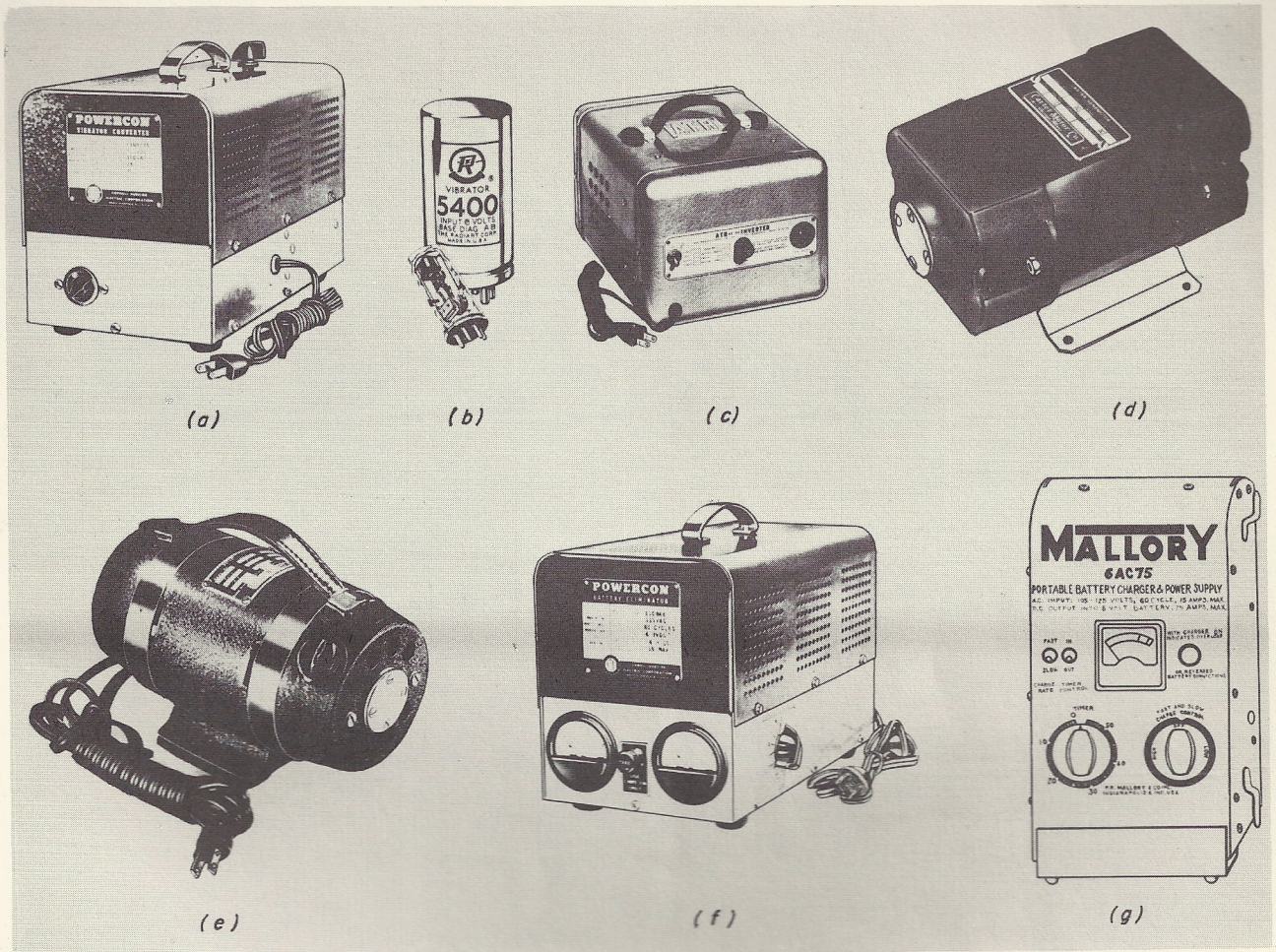
- a. Tone arm (pickup arm)
- b. Crystal-type replacement pickup
- c. Crystal-type replacement pickup
- d. Magnetic-type replacement pickup
- e. Three-speed phono changer
- f. Phono turntable and motor

Fig. 1-13. Phonograph Parts



- a. A "battery" — a single cell
- b. Battery of several cells
- c. B battery
- d. A-B battery pack

Fig. 1-14. Batteries and Battery Packs



- a. Vibrator power supply
- b. Replacement Vibrators
- c. A.C.-D.C. inverter – changes d.c. to a.c.
- d. Dynamotor – changes low voltage d-c power to high voltage d-c power
- e. Rotary converter – changes d.c. to a.c.
- f. Battery eliminator
- g. Battery charger

Fig. 1-15 Power-Supply Equipment